



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,244	03/03/2004	David R. Hembree	3592.10US (97-0321.10/US)	3976
24247	7590	12/14/2004	EXAMINER MITCHELL, JAMES M	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			ART UNIT 2813	
DATE MAILED: 12/14/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/792,244

Applicant(s)

HEMBREE, DAVID R.

Examiner

James M. Mitchell

Art Unit

2813

A2

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 May 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/3/04, 8/30/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

This office action is in response to the preliminary amendment filed May 17, 2004.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernier et al. (U.S. 6,069, 023) in combination with McDonald Jr. et al. (U.S. 5,905,638).

Bernier (Fig 6) discloses (cl. 1,4,6, 9) a semiconductor assembly comprising: a substrate (304) having a plurality of circuits (310) on a portion of a surface thereof; a semiconductor die (302) having a plurality of inherent bond pads (not labeled, chip surface contacting item 308) located on an active surface thereof (flip chip configuration) and having a back side (top portion) surface; a plurality of solder balls (308) connecting at least a portion of the plurality of bond pads of the semiconductor die to at least a portion of the plurality of circuits of the substrate; one of a glob top material and a low viscosity polymeric material ("epoxy" shown as 220) filling any space between the substrate and the semiconductor die; is compliant (i.e. "flexible"; abstract), adhesive, and filled with a thermally conductive material (Claim 14 of Bernier); and a heat sink cap (320) covering the adhesive, the semiconductor die, the plurality of solder balls, and a portion of the substrate, the heat sink cap contacting at least a portion of the adhesive;

(cl. 2, 5, 7, 10) with the heat sink cap including fins (protruding portion of 320) wherein the compliant adhesive is silicone filled with a thermally conductive material (Claim 14 of Bernier).

Bernier does not appear to show gel elastomer that is a cross-linked silicone filled with a thermally conductive material that forms a gel elastomer.

Macdonald utilizes a silicone gel elastomer (col. 5, Lines 1-5) that is inherently cross-linked (i.e. applicant defines gel elastomer as being cross linked silicone).

It would have been obvious to one of ordinary skill in the art to incorporate a silicone gel elastomer in order to enhance thermal conductivity as taught by MacDonald (Co. 5, Lines 1-5).

### ***Conclusion***

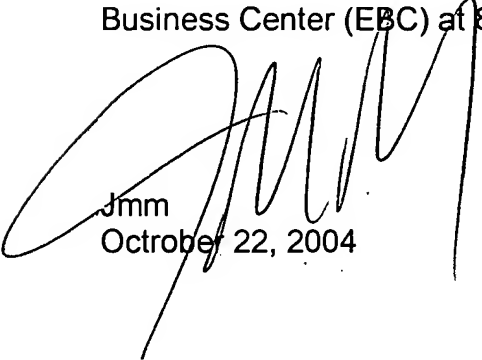
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. MacDonald Jr. et al. (U.S. 5,905,638).

The prior art in McDonald Jr. discloses the use of a gel elastomer between silicone gel elastomer between a chip and heat sink.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jmm  
October 22, 2004



CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800